



Novel method to optimize biochar production scheme to achieve NetZero in UK:

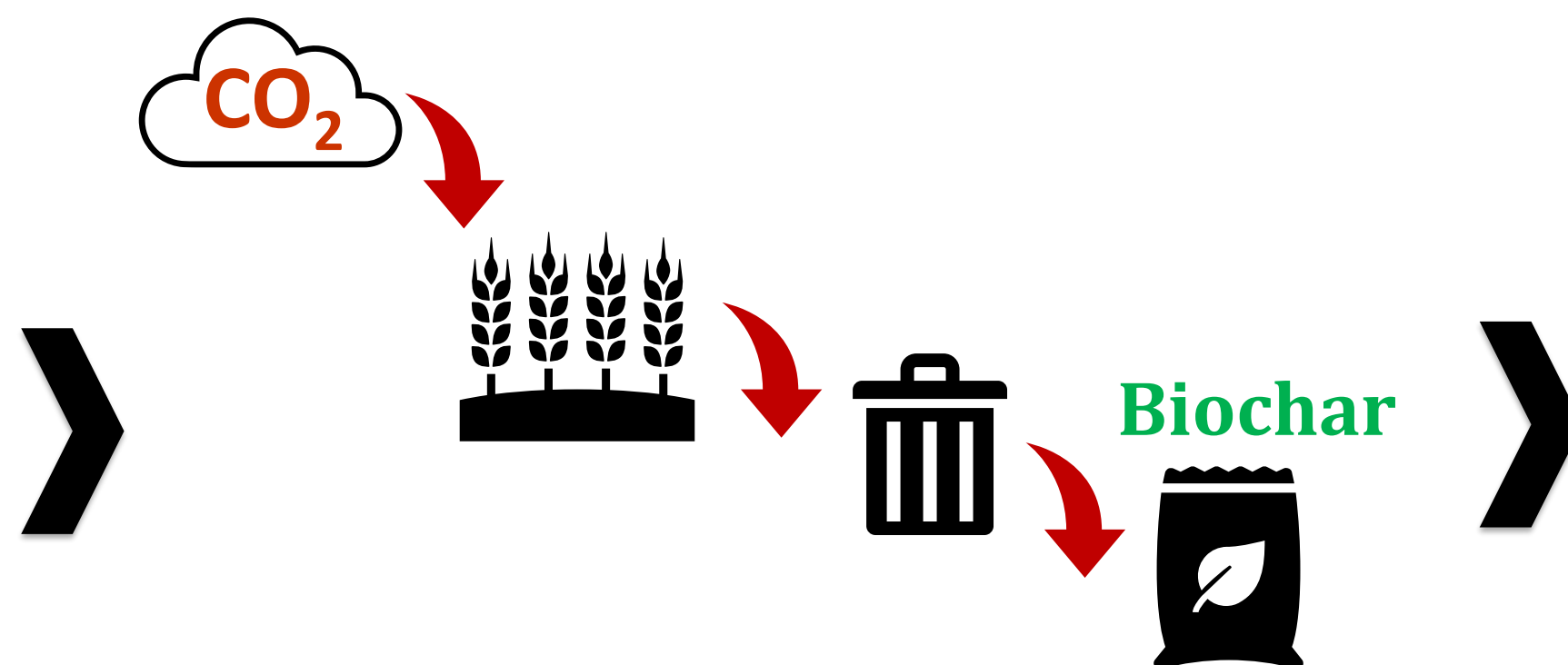
A spatial-cost optimization model to identify ideal production plants, locations, scales, and feedstock network

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Introduction



Cost-effective greenhouse gas removals (GGRs) are essential to achieve NetZero target



Biochar is a promising GGR which removes CO₂ from atmosphere and stores for centuries to millennia

For a **sustainable biochar production** scheme in the UK,

- How many production plants needed?
- At what locations?
- In what scales?
- From which feedstock suppliers?

achieves a **minimum cost and GHG emission!!!**

Our approach

Develop a **tool to identify** financially and environmentally viable **business models** for biochar production

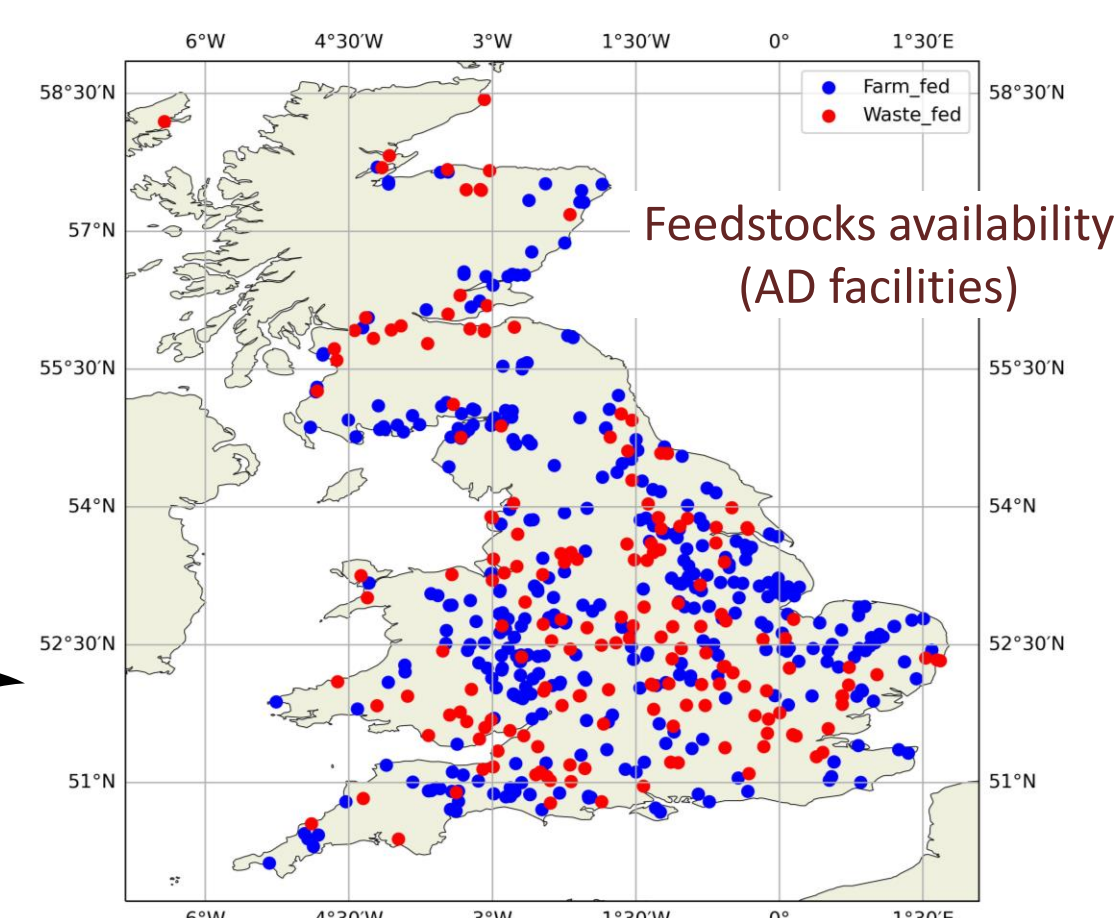
Considering the balance of levelised cost of production and net life cycle greenhouse gas emissions



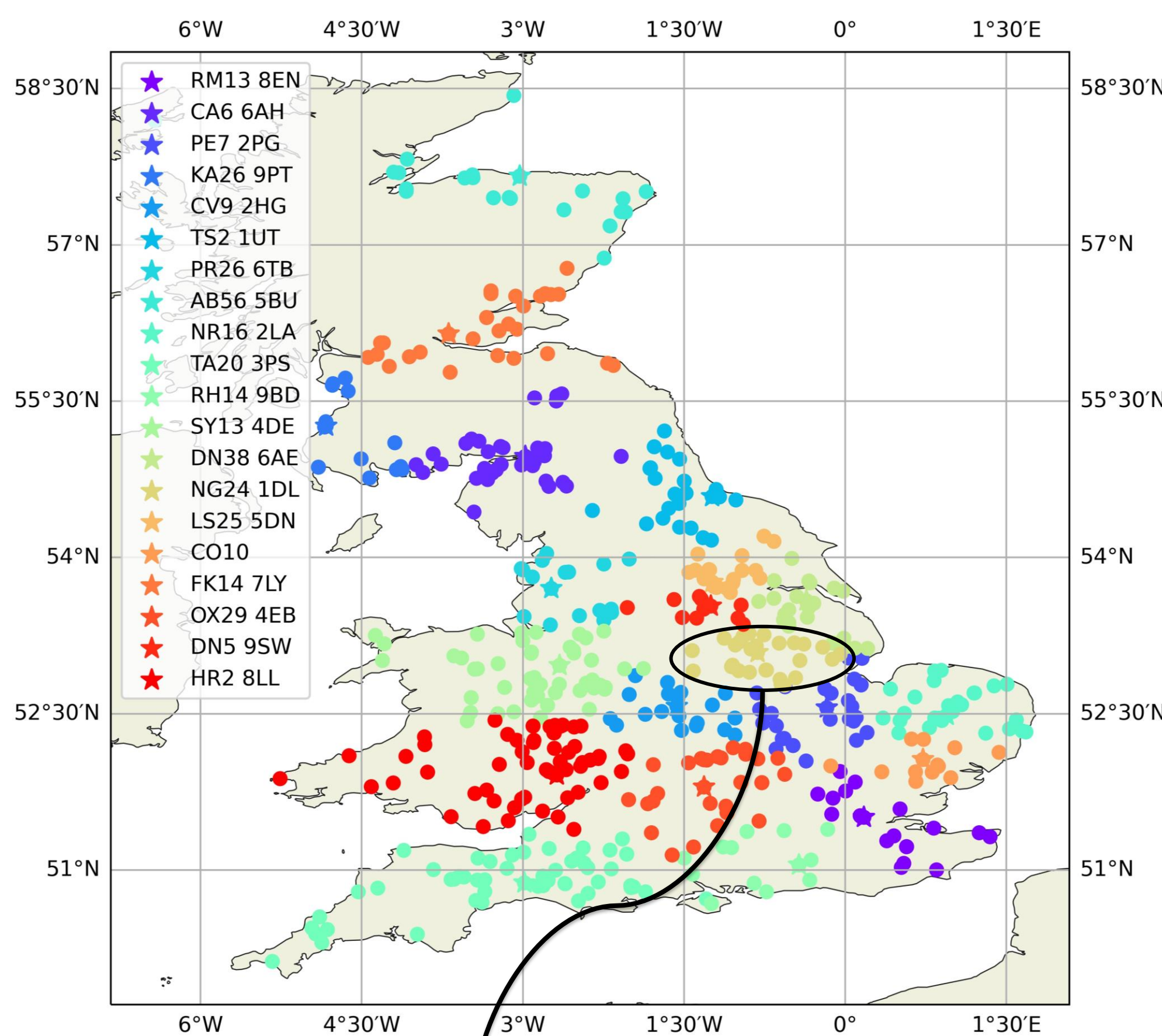
Outcome: Sustainable biochar production scheme for UK

Digestate-based biochar production

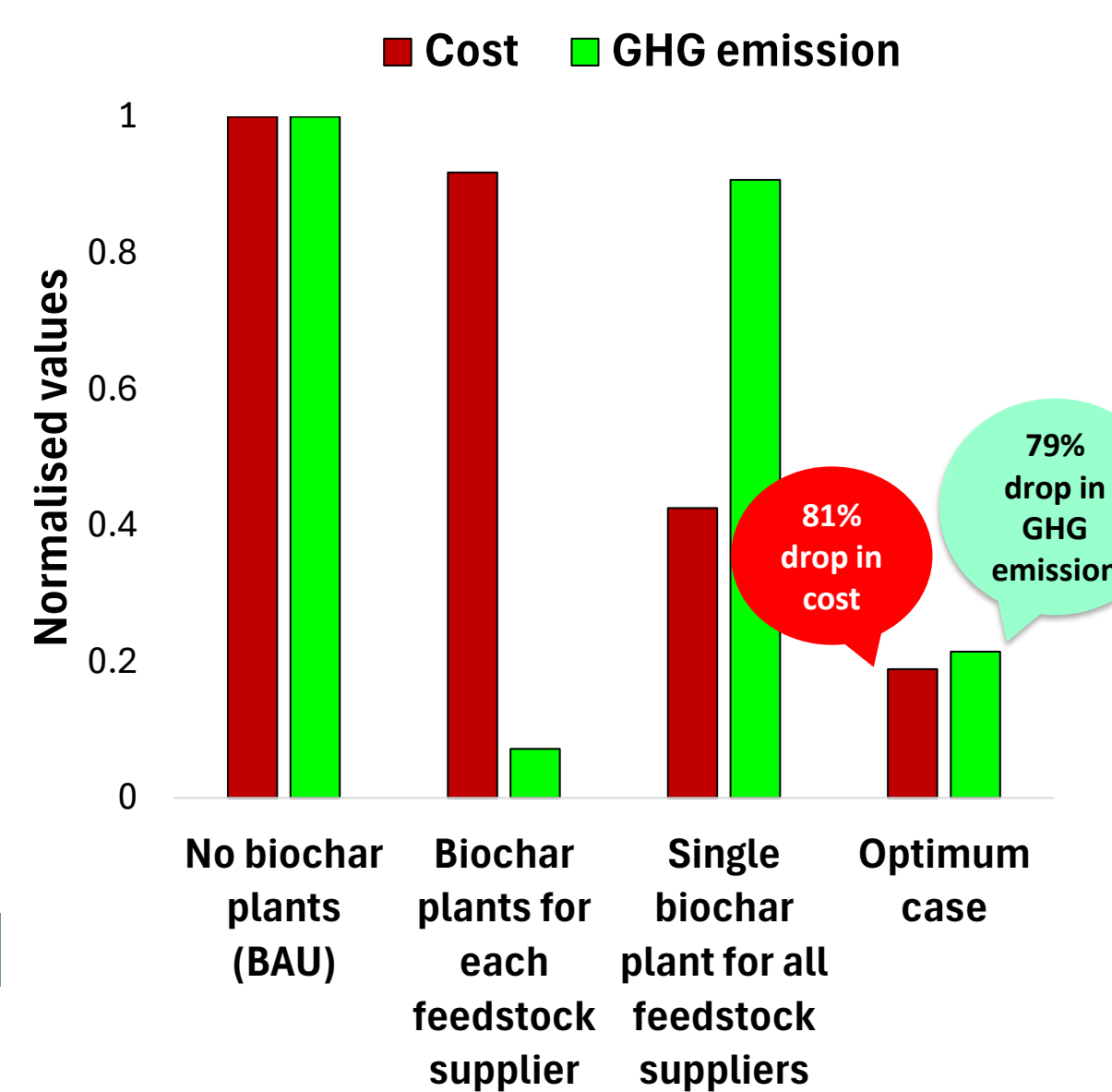
- Feedstock: Solid output (**digestate**) from anaerobic digestion (AD) facilities
- Business as usual (BAU): Digestate incineration
- Actual road transportation of digestate



Optimum biochar production plants network for Great Britain



Comparison with the current use of digestate identifies **the huge financial and environmental benefits** of optimising biochar production in UK



Model provides in-depth details of each potential biochar production plant

Biochar production plant details		
Location	NG14 1DL	Post code
Plant scale	0.77	Mt p.a.
Biochar production	0.09	Mt p.a.
Total cost	12	M£ p.a.
Levelised cost	134	£ per t-biochar
Transport cost	3.4	M£ p.a.
GHG emission	4.7	kt-CO ₂ p.a.

What's next?

This tool can be modified to apply for any production scheme for any region in the world

Mixed feedstock scenarios for biochar production in UK

Competitive use of feedstocks (biochar and other GGRs) to identify most promising applications for NetZero

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